

Abstract

The invention concerns a novel method of forming an inverted titania photonic crystal on a substrate with titania in nanocrystalline anatase form. According to the invention it is possible to fabricate an inverted titania photonic crystal by providing a template comprising a colloidal crystal template on a substrate comprising organic polymer particles, and into the voids of the colloidal crystal template is introduced a noncolloidal inorganic precursor by subjecting the noncolloidal inorganic precursor and the colloidal crystal template on a substrate to the gravitational force which is applied by centrifugation that permeates the noncolloidal inorganic precursor through the voids of the colloidal crystal template. The noncolloidal inorganic precursor is hardened and the colloidal crystal template is removed by heating. The resulting material is a robust, mechanically stable and high quality structured inverted nanocrystalline titania photonic crystal on a substrate that exhibits three dimensional periodic structure.